UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

October 4, 2011

Billy Ray, Manager
Rio Algom Mining LLC
P.O. Box 218
Grants, New Mexico 87020

SUBJECT: NRC INSPECTION REPORT 040-08905/11-001

Dear Mr. Ray:

This refers to the announced inspection conducted on August 16 and 17, 2011, at Rio Algom Mining's Ambrosia Lake facility located near Grants, New Mexico. The inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The preliminary inspection findings were discussed with you at the exit briefing conducted at the conclusion of the onsite inspection. The final inspection findings were presented to you by telephone on September 8, 2011. The enclosed report presents the results of this inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to make one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Ms. Linda M. Gersey, Health Physicist, at (817) 860-8299, or the undersigned at (817) 860-8191.

Sincerely,

/RA/

D. Blair Spitzberg, Ph.D., Chief
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

Docket: 040-08905
License: SUA-1473

Enclosure:
NRC Inspection Report 040-08905/11-001

cc w/enclosure:

New Mexico Radiation Program Director

Art Kleinrath
Long Term Surveillance Project Manager
U.S. Department of Energy
Grand Junction Project Office
2597 B 3/4 Road
Grand Junction, Colorado 81503

Internal distribution w/enclosure:
V. Campbell, DD:DNMS
T. McLaughlin, FSME/DWMEP/DURLD
W. VonTill, FSME/DWMEP/DURLD
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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	040-08905
License:	SUA-1473
Report:	040-08905/11-001
Licensee:	Rio Algom Mining Co.
Facility:	Former Ambrosia Lake Mill
Location:	McKinley County, New Mexico
Dates:	August 16 and 17, 2011
Inspector:	Linda M. Gersey, Health Physicist Nuclear Materials Safety Branch B
Approved by:	D. Blair Spitzberg, Ph.D., Chief, Repository and Spent Fuel Safety Branch Division of Nuclear Materials Safety
Attachments:	Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

Rio Algom Mining Company's Former Uranium Mill
NRC Inspection Report 040-08905/11-001

This inspection included a review of site status, management organization and controls, radiation protection, operator training, maintenance and surveillance testing, environmental protection, transportation and radwaste activities, and emergency preparedness. In summary, the licensee was conducting activities safely and in accordance with regulatory and license requirements.

Management Organization and Controls

- The organizational structure and staffing levels were sufficient for the work in progress (Section 1).

- Site procedures were established and As Low As Reasonably Achievable (ALARA) audit was performed (Section 1).

Radiation Protection

- The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license (Section 2).

- Employee and contractor doses were below regulatory limits (Section 2).

Operator Training and Retraining

- Radiation protection training was provided to site workers as required by regulations and the license (Section 3).

Maintenance and Surveillance of Safety Controls

- Radiation survey instruments and air samplers were being calibrated as required by site procedures (Section 4).

- Daily and weekly radiological inspections were being performed (Section 4).

Effluent Control and Environmental Protection

- The licensee had implemented the environmental monitoring program as required by the license and regulations (Section 5.2a).

- Two compliance wells were in exceedance of the alternate concentration limits and were being sampled monthly (Section 5.2b).

- Thirteen wells were identified as having to be replaced due to integrity issues (Section 5.2b).

Inspection of Transportation Activities and Radioactive Waste Management

- The licensee was conducting transportation and waste disposal operations in accordance with license requirements (Section 6).

Emergency Preparedness

- The licensee had adequate procedures, equipment, and training needed to respond to emergencies (Section 7).

Report Details

Site Status

Rio Algom Mining's Ambrosia Lake conventional mill ceased operations in 1985 and is currently undergoing decommissioning. The mill was demolished between November 2003 and February 2004. Remaining onsite structures included the machine shop, water treatment facility, ion exchange building, and site offices. At the time of this inspection, the licensee was focusing on continued groundwater monitoring and site maintenance.

The following is the status of the facility at the time of the inspection:

- Pond 1 Tailings Cell has a final radon barrier and rock cover, which was approved by the NRC in the mid-1990's.

- Pond 2 Tailings Cell does not have a radon barrier or rock cover, although the NRC approved the cover design in June 2009.

- Pond 3 Tailings Cell contains wind-blown material and has clean soil and rock cover. Pond 3 Tailings Cell does not require formal approval from NRC for closure, although the work completed will be part of the Master Completion Plan. A rock erosion cover on the slopes of Pond 3 was completed in October 2009.

- The 1000-year external diversion channel was completed and NRC observed the construction in May 2009.

The following actions require completion in accordance with the reclamation plan:

- Contractors to demolition the remaining 12 structures.

- Construct the interior diversion channel.

- Regrade soil cover and place rock cover on evaporation ponds 4, 5, and 6. The NRC has approved alternate release criteria for these ponds.

- Identify and remove contaminated soil from mill yard. After contaminated soil is removed, re-grade and vegetate area.

- Remove radium settling pond sediments for disposal.

- Evaporation ponds 7 and 8 have soil covers but not rock covers. South side channel needs to be re-enforced.

- Radon barrier borrow pits need to be reclaimed.

- Section 4, the former evaporation pond area, had several thorium-230 surface soil results that did not meet the cleanup standard and several soil results that did not meet

the sum-of-ratios criteria for natural uranium, thorium-230, and radium-226. The licensee plans to assess the next steps for handling this situation in addressing the elevated soil results.

- An Alternate Disposal Site was approved by the NRC, although the licensee must receive State approval prior to use.

Although not part of the reclamation plan, the replacement of 13 groundwater wells, including 6 wells approved for alternate concentration limits, need to be completed.

1 Management Organization and Controls (88005)

1.1 Inspection Scope

Ensure that the licensee had established an organization to administer the technical programs and established programs to perform internal reviews, self-assessments, and audits.

1.2 Observations and Findings

Rio Algom Mining has six employees assigned to the project. The highest ranking employee onsite was the Site Manager. The Site Manager was appointed effective June 2010, replacing the former company president who has retired but remains on-site as a consultant. The Environmental Supervisor serves as the Radiation Safety Officer (RSO) and is responsible for implementation of the radiation protection program. Two radiation/environmental technicians assist the RSO with the radiation protection duties. The licensee used contractors to conduct reclamation work as needed. Other contractors onsite included security staff. The inspector concluded that the licensee's staffing and organization were appropriate for the work in progress.

License Conditions 14 and 16 require, in part, that written procedures be established and reviewed by the RSO at least annually. The inspector reviewed several written procedures related to health physics and environmental monitoring and determined that they were adequate. The inspector noted that the RSO had performed an annual procedure review for 2011.

The RSO conducted the licensee’s annual As Low As Reasonably Achievable (ALARA) audit on February 28, 2011, for calendar year 2010, as required by 10 CFR 20.1101(c), which was submitted to the NRC for review. The ALARA audit described the facility activities during the year, compiled data on the health physics sampling activities, and reviewed exposure summaries. The inspector found the ALARA audit to be adequate.

1.3 Conclusions

The organizational structure and staffing levels were sufficient for the work in progress. Site procedures were established and ALARA audit was performed.

2 Radiation Protection (83822)

2.1 Inspection Scope

Determine if the licensee's radiation protection program was in compliance with license and 10 CFR Part 20 requirements.

2.2 Observations and Findings

a. Radiation Protection Program Review

The licensee's personnel monitoring program included the use of optically stimulated luminescence dosimeters to monitor external gamma exposures. The inspector reviewed the licensee's exposure records for 2010 through the second quarter 2011. In 2010, a total of 11 employees and contractors were monitored for occupational exposure. The highest deep dose equivalent exposure for 2010 was 4 millirems. During the first and second quarters 2011, all dosimeters were below the minimum detectable threshold.

In addition to external exposure monitoring, the licensee conducts internal monitoring for radon progeny using lapel air samplers, when appropriate. When work is being conducted in the lined evaporation ponds, lapel air samplers are assigned to selected workers. From 2010 through the date of the inspection, no internal doses were assigned to individuals from radon progeny.

License Conditions 16 and 17 specify, in part, the licensee's bioassay sampling requirements. Bioassay sampling was conducted quarterly for licensee employees. The inspector reviewed the sample results collected for 2010 through the second quarter 2011. All bioassay sample results reviewed by the inspector were less than the lower limit of detection of 5 micrograms of uranium per liter of urine.

The licensee calculated total effective dose equivalent exposures based on the results of external and internal monitoring. The highest total effective dose equivalent exposure for 2010 was 4 millirems, while the highest exposure in the second quarter 2011 was less than 1 millirem. The regulatory limit for occupational exposures is 5,000 millirems. Therefore, radiation exposures received by occupationally exposed individuals remained below the regulatory limit.

Airborne uranium sampling was conducted by the licensee quarterly at a minimum of six locations. The inspector reviewed the airborne uranium sample results the licensee had documented from 2010 through the second quarter of 2011. Uranium activity in the air was measured by the licensee to be at background levels and was determined to be less than 1 percent of the derived air concentration limit for soluble natural uranium.

Airborne radon progeny sampling was conducted quarterly at 12 plant locations. The inspector reviewed the sampling results for 2010 through the second quarter of 2011. The average working level concentration in the ion exchange building was 0.02, and all other buildings averaged 0.0 working levels. All samples were below the derived air concentration limit of 0.33 working levels.

Ambient gamma radiation exposure rate measurements were collected semiannually at nine locations. The results since the last inspection were reviewed by the inspector. The highest measurements observed by the licensee were consistently obtained in the ion exchange building, which were less than 5 millirem per hour. This building is located within the radiologically restricted area of the site. No areas in the facility are posted radiation areas.

The licensee monitored for contamination through radiological surveys of equipment, surfaces, and personnel. In addition to routine radiological surveys, the licensee monitored for personnel contamination through quarterly random surveys of employees. Surface contamination surveys were required to be conducted at least monthly and at a minimum of 10 locations. The contamination surveys consisted of taking swipe samples for removable alpha particulate contamination. The records reviewed by the inspector of samples collected since the last inspection indicated that no individual or location had exceeded the licensee's respective action levels.

Equipment release surveys were conducted by the licensee prior to releasing components for unrestricted use. Since the previous inspection, only one piece of equipment was released for unrestricted use. The inspector reviewed the results of the gamma survey, alpha contamination, and gross alpha wipes for the released equipment. Based on the licensee's records that were reviewed by the inspector, no equipment was identified as having been improperly released for unrestricted use.

b. Site Tours

The inspector conducted extensive site tours with the Site Manager and the RSO. Specific areas visited included: the Section 4 ponds area; Pond 3, 4, 5, and 6; the IX building; water treatment building; and the proposed alternate disposal cell. The inspector determined that licensed material was secure within the site property, as required by 10 CFR 20.1801 and 20.1802, and fences were posted with radioactive material signs as required by License Condition 28. Fences and gates were observed to be in good condition. In addition, the inspector observed that the licensee had maintained routine security coverage at the site.

During the site tour, the inspector measured the ambient gamma radiation exposure rates using a microRoentgen survey meter (Ludlum Model 19, NRC No. 015546, calibration due date 02/21/2012, calibrated with Radium-226). At the reception desk in the administration building, a level of 15 microRoentgen per hour (μR/hr) was noted. Radiation levels measured in the conference room in the administrative building were 17 μR/hr compared to levels of approximately 70 μR/hr behind the building. Levels in the maintenance shop were 20 μR/hr, while those in the guard shack and change room area were 10 μR/hr.

While touring the Section 4 area, the inspector noted radiation readings at the locked entry gate to this area were 16 μR/hr, while levels in the general area of the reclaimed ponds ranged from 12 to 156 μR/hr. The highest measurements observed by the inspector during the site tour were in the ion exchange building. Levels near piping ranged from 200-250 μR/hr, while measurements near resin processing areas reached 1200 μR/hr. The maximum level found, 4500 μR/hr, was located in piping near an elbow. In summary, throughout the site tour, no levels were noted that would require posting as a radiation area (5000 μR/hr).

2.3 Conclusions

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license. Employee and contractor doses were below regulatory limits.

3 Operator Training and Retraining (88010)

3.1 Inspection Scope

Determine whether the licensee was complying with regulations and license requirements related to the training of employees.

3.2 Observations and Findings

The inspector reviewed the licensee's training program to determine compliance with 10 CFR 19.12, which requires, in part, that occupational exposed workers be provided radiation safety training. Annual refresher training for all employees was provided by a consultant in March 2011. The inspector noted that training records provided by the licensee included written radiation safety tests and appeared to be adequate. Since 2004, U.S. Department of Transportation hazardous material training has not been conducted, nor is the training required, since there have been no radioactive material shipments made by the licensee offsite on public roads since that time.

3.3 Conclusions

Radiation protection training was provided to site workers as required by regulations and the license.

4 Maintenance and Surveillance of Safety Controls (88025)

4.1 Inspection Scope

Determine whether surveillance tests and calibrations were being conducted in accordance with license requirements and site procedures.

4.2 Observations and Findings

License Condition 20 requires, in part, that calibration of equipment be documented. The inspector reviewed the licensee's instrument calibration records created since the last inspection. Equipment being calibrated included an assortment of radiological survey instruments and air samplers. The licensee had maintained documentation demonstrating that the equipment had been properly calibrated at the respective intervals specified in the license application. Equipment in use during the inspection appeared fully functional with up-to-date calibrations. In summary, the licensee maintained a sufficient number of calibrated instruments necessary to implement the requirements of the license.

The licensee's radiation safety staff conducts daily inspections during normal work days to ensure general radiological control practices are being used. The RSO also performs a weekly inspection in restricted areas. The inspector reviewed the documented

inspections for 2010 through July 2011. No unusual radiological conditions were found that required corrective action.

4.3 Conclusions

Radiation survey instruments and air samplers were being calibrated as required by site procedures. Daily and weekly radiological inspections were being performed.

5 Effluent Control and Environmental Protection (88045)

5.1 Inspection Scope

Determine if the environmental and effluent monitoring programs used by the licensee are adequate to monitor the impacts of site activities on the local environment.

5.2 Observations and Findings

a. Environmental Monitoring

License Condition 10 requires, in part, that the licensee maintain an environmental monitoring program, and License Condition 19 requires, in part, that the licensee submit the results of the environmental monitoring to the NRC in semiannual reports. The licensee's environmental monitoring program is described in its Health Physics and Environmental Procedures Manual. The licensee's environmental monitoring program consisted of obtaining air particulate, radon, gamma radiation, soil, surface water, sediment, and vegetation samples.

Air particulates were sampled at the seven environmental sampling stations using high volume air samplers. The sample filters were exchanged weekly and analyzed quarterly for natural uranium, thorium-230, radium-226, and lead-210 concentrations. The inspector reviewed the sampling results for the second half of 2010 through the first half of 2011. Most of the air sample results obtained by the licensee were determined to be less than one percent of the limit for each constituent, as each is specified in 10 CFR Part 20, Appendix B.

Radon-222 was monitored at the seven environmental sampling stations. The track-etch canisters were exchanged quarterly and processed by an outside vendor. During 2010, the highest radon-222 reading was measured at the Section 30W VH6 location. The annual average radon-222 effluent concentration was 2.37 picocuries per liter. This result remained below the 10 CFR Part 20, Appendix B, effluent concentration limit of 10 picocuries per liter.

Gamma radiation was monitored at each of the seven environmental sampling stations. The dosimeters were exchanged quarterly and processed by an outside vendor. Since the previous inspection, the highest gamma readings have been at the Section 30W VH6 sampling station. The highest quarterly rate was for the second quarter of 2011, with a measurement of 10.5 millirems.

Vegetation samples are collected three times a year near the seven environmental sampling stations. The vegetation samples were analyzed for natural uranium,

thorium-230, radium-226, and lead-210 concentrations. No acceptance criteria have been established for vegetation; the environmental samples are collected for trending purposes only. The inspector reviewed the sampling results from 2010 through the second quarter of 2011 and found no adverse trends.

Soil samples are collected annually at the seven environmental sampling stations. The soil samples are analyzed for natural uranium, thorium-230, radium-226, and lead-210 concentrations. No acceptance criteria have been established for soil, the environmental samples are collected for trending purposes only. The inspector reviewed the soil sampling results from 2010 through the second quarter of 2011 and found no adverse trends.

Four creek bed sediment samples were collected annually and analyzed for natural uranium, thorium-230, radium-226, and lead-210 concentrations. The environmental sampling is conducted for trending purposes only. The inspector reviewed the sediment sampling results from 2010 through the second quarter of 2011 and found no adverse trends.

License Condition 39 requires, in part, that the licensee conduct an annual land use survey in the area within 2 miles of the former mill and submit a report to the NRC by July 1st of each year. The inspector reviewed the annual land survey reports submitted by the licensee for 2010 and 2011. Each report contained an adequate land use survey and no major changes were noted.

The licensee used a consultant to assess the dose to members of the public for 2010, as required by 10 CFR 20.1301 and 10 CFR 20.1302. The consultant used the effluent monitoring data, which included the direct gamma, radon, and uranium particulate results for 2010. The highest dose to a member of the public was determined to be for the nearest resident, with a total effective dose equivalent of 11 millirem. All exposure results from direct gamma radiation. The license was maintaining dose to members of the public less than the 100 millirem per year limit. The inspector reviewed the consultant's report and agreed with the assessment.

b. Groundwater Compliance Monitoring Program

License Condition 34 provides, in part, the requirements of the groundwater compliance monitoring program. In February 2006, the NRC approved the licensee's request for implementation of groundwater alternate concentration limits (ACLs) for several constituents. The inspector reviewed the groundwater monitoring data from the second half of 2010 through the second half of 2011.

During November 2006, the licensee notified the NRC regarding the elevated beryllium concentrations observed in the Dakota Point of Compliance Well 36-06 samples. The licensee submitted a proposed corrective action plan to the NRC in January 2007 to address the elevated beryllium concentrations, a request that was subsequently approved by the NRC in April 2007. During the second quarter 2007, the licensee also noted an elevated level of cadmium in Well 36-06. Since the discovery of the elevated beryllium and cadmium concentrations in Dakota Point of Compliance Well 36-06, the licensee has taken monthly water samples at this well, and results have shown a slow decline in beryllium and cadmium concentrations in the water. The elevated beryllium and cadmium were attributed to surface work conducted near the well.

In the July 31, 2008, semiannual groundwater monitoring report, the licensee noted the exceedance of the uranium concentration from Tres Hermanos B Compliance Well 31-02. All 2009 and 2010 uranium results were below the ACL of 1.6 milligrams per liter and the licensee had plans to return to quarterly sampling of Well 31-02 during 2011. In May and June 2011, the uranium concentrations exceeded the ACL again in Well 31-02. The licensee questions the integrity of this well and is planning on replacing it upon approval from the State and NRC. Concerns over the integrity of Well 31-02 have resulted in a review of the integrity of the entire monitoring network. A total of thirteen (13) wells have been identified as needing to be replaced.

5.3 Conclusions

The licensee had implemented the environmental monitoring program as required by the license and regulations. Two compliance well were in exceedance of the ACLs and were being sampled monthly. Thirteen wells were identified as having to be replaced due to integrity issues.

6 Inspection of Transportation Activities and Radioactive Waste Management (86740 and 88035)

6.1 Inspection Scope

Determine if transportation and disposal activities were being conducted in compliance with regulatory requirements.

6.2 Observations and Findings

Two tailings ponds were used to dispose of tailings generated during uranium ore processing operations. Pond 1 contains about 30 million tons of mill tailings, covering 260 acres; Pond 2 contains 3 million tons of tailings, covering 90 acres. Both mill tailings ponds were covered with final radon barriers in 1995 and 1996, respectively, excluding a portion of Pond 2 which was still being used for byproduct material disposal. Tailings Pond 2 does not have a rock cover and final radon barrier on the northern end of the pond, because the licensee plans to continue to dispose of material collected from the lined pond projects into this portion of Pond 2.

In the previous inspection report, dated September 24, 2010, it was inadvertently stated that the licensee performs annual radon flux monitoring on the Pond 2 Tailings Cell in compliance with 10 CFR Part 40 Appendix A, Criterion 6A(2). A section of Pond 2 is actively being used for disposal, and thus annual radon flux measurements are not required. The licensee annually performs a small number of radon flux measurements on Pond 2, but this activity is not required. The licensee's results show the radon flux on Pond 2 to be below 20 picocuries per meter squared per second.

Since the previous inspection, the licensee had not received nor shipped radioactive material. The licensee stated that they have no near future plans to ship any radioactive material off site.

6.3 Conclusions

The licensee was conducting transportation and waste disposal operations in accordance with license requirements.

7 Emergency Preparedness (88050)

7.1 Inspection Scope

Determine if the licensee's emergency preparedness program was being maintained in a state of readiness.

7.2 Observations and Findings

The inspector reviewed the August 2008 Health, Safety and Environment Training that is used for new employees and visitors not requiring unescorted access. The document contains site rules for working safely and includes transportation and traffic management. Visitor check-in requirements are noted, as is personal protection equipment for the site. The document also contains a quick reference guide for emergency situations, including up-to-date phone numbers for site and regulatory agencies. Sections of the document outline emergency evacuation procedures, the location of a first aid station and supplies, and awareness of the location of Material Safety Data Sheet information. Also noted are actions to take in case of fire, injuries and near misses, and hazardous material spills. ALARA requirements are also discussed. Samples of warning signs that exist at the site were also included. During site tours the inspector noted emergency equipment and supplies to be adequate for current activity at the site. The licensee noted that, in the case of a significant medical emergency, a Life-Flight helicopter would be utilized to transport injured personnel. During June 2011, the licensee held an in-house fire training class for all employees.

7.3 Conclusions

The licensee had adequate procedures, equipment, and training needed to respond to emergencies.

8 Exit Meeting Summary

The inspector presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on August 17, 2011. The final inspection findings were presented to the site manager by telephone on September 8, 2011. Representatives of the licensee acknowledged the findings as presented. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

C. Wentz, Radiation safety Officer
B. Ray, Site Manager

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

INSPECTION PROCEDURES USED

IP 83822	Radiation Protection
IP 86740	Inspection of Transportation Activities
IP 88005	Management Organization and Controls
IP 88010	Operator Training and Retraining
IP 88025	Maintenance and Surveillance of Safety Controls
IP 88035	Radioactive Waste Management
IP 88045	Effluent Control and Environmental Protection
IP 88050	Emergency Preparedness

LIST OF ACRONYMS USED

ACL	alternate concentration limit
ALARA	as low as reasonably achievable
IP	NRC inspection procedure
NRC	Nuclear Regulatory Commission
RSO	radiation safety officer
µR/hr	microReontgen per hour